@
S471
A83 H7

New York
State College of Agriculture
At Cornell University
Ithaca, N. Y.

Library

Cornell University Library

The original of this book is in
the Cornell University Library.

There are no known copyright restrictions in
the United States on the use of the text.

http://www.archive.org/details/cu31924000216543

Canterbury Progress League

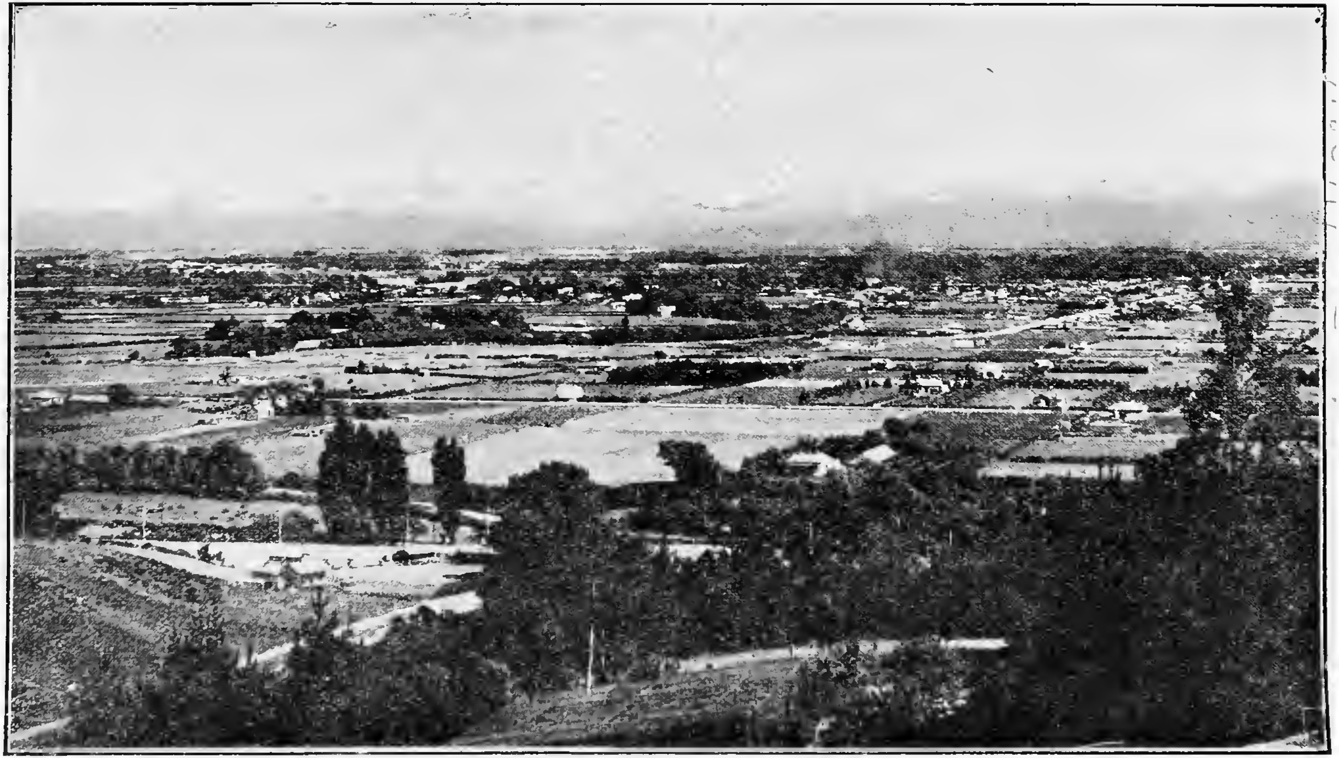
The Primary Industries of Canterbury

By G. H. HOLFORD, B.Ag.

Bulletin No. 1

Paper read before Council of Canterbury Progress League
March 19th, 1919.

CHRISTCHURCH:
M.W.
PRINTED BY THE CHRISTCHURCH PRESS COMPANY LIMITED



VIEW OF FERTILE CANTERBURY PLAINS FROM THE PORT HILLS. SOUTHERN ALPS IN DISTANCE.

PREFACE.

Early in the year the writer was asked by the Executive Committee of the Canterbury Progress League to collect data with regard to the present position of the primary industries in Canterbury, and to submit suggestions as to the lines along which increased production seemed to lie, with also an outline of the manner in which the League could use its organisation in aiding primary producers.

The first report on the above lines was given in a paper read before the first meeting of the General Council of the League on March 19th last.

When it was decided to print the report in pamphlet form the writer enlarged certain sections, but what is contained in the following pages is virtually the same as was submitted to the General Council. In the preparation of the paper the writer has not hesitated to seek assistance from those whose experience of Canterbury rural affairs enabled them to speak authoritatively on certain matters, and any value this paper may have is largely due to the helpful suggestions so freely given by these men. Again, certain ideas that are set out herein on such questions as Illustration Farms and Farmers' Bureaux have been borrowed from other lands, so, speaking generally, it is practically only the cord that binds the ideas that is original.

The information contained in this paper is not held to be complete in any degree, as it covers the ground of a preliminary investigation only. It was primarily intended that it should serve chiefly as a basis for the more detailed inquiry which is to be carried out by means of the special Sectional Committees that are being set up by the League.

If the publication of these few pages assists, even to a minor extent, the League and the primary producers in the task that lies before them, the writer will feel amply repaid for the little time and labour devoted to the work.

G. H. HOLFORD.

PRIMARY INDUSTRIES

POSITION IN CANTERBURY

NEED FOR INCREASED PRODUCTION.

The importance of the primary industries to the welfare of New Zealand only needs mentioning to be fully appreciated by this Council, composed as it is of so many who are directly engaged in rural matters. With an increasing population, other means of wealth-production will and must be developed, but for some years to come the primary industries will continue to be, as they have been in the past, the chief string to our economic bow, and increasing prosperity in these matters will filter through all sections of the community.

The present Minister of Agriculture in his last annual report stated that "Agricultural development and increased production will undoubtedly be the country's main concern after the war, and our best knowledge and energies must be directed to the task." In support of this, one has merely to mention that the pastoral products alone make up 87 per cent. of the Dominion's exports.

Great as has been the development in rural matters in the past, there must be increased expansion now and in the future. Within the past ten years both the national and the local bodies' debts have doubled; recent figures give the former as equal to £132 per head of population. The war, of course, has added greatly to our burden, as since 1914 the national debt has increased by 50 per cent. It is to be hoped that the aftermath of the war will be a stimulation to agricultural development akin to that which occurred in America after the Civil War, in France after 1871, and in Denmark after she lost Schleswig-Holstein.

We all know that the war brought with it a great demand for food products, and prices have materially risen—in some cases by over 100 per cent. This meant increased profits, of course, to certain sections of the community, but slowly and surely producing costs advanced along with rising prices.

Some day—perhaps not very far off—prices in certain staple articles will fall, but there will not be a corresponding decrease in cost of production, rents, labour, etc. This is what all must prepare for, and to that end it will be necessary to take stock of all industries and to see in what manner economies can be effected to meet the probable situation.

Expanding Markets To gain a true appreciation of matters rural it is necessary to take the long view, because at present there are conditions of a transitory nature existing which may blind us to the need for increased effort.

At present there is a considerable accumulation of primary products in New Zealand due almost entirely to the shortage of ships. An appreciation of the international situation in regard to food products would, however, prevent anybody being misled by this position in New Zealand. It has been estimated that the world's herds and flocks have been reduced directly by the war to the extent of some 115,000,000 head. We know only too well that many consumers have gone also, but those best able to judge state that there will be a world shortage of food for several years to come. It must, however, be fully realised that in this Dominion increase in production must go hand in hand with increased consumption, and so just a word with regard to CONSUMING markets, which often fail to receive the attention they deserve. So far as markets are concerned, we have to-day one basket for a good many eggs, as by far the greatest percentage of our exportable surplus goes to Britain. The war accentuated this position to some extent, and last year out of a total of 30½ millions sterling in exports, 25⅓ millions went to Britain. The question is, can Britain continue to absorb such a large percentage of our exports? Indications are that she may not. The war has shown the Motherland how dependent she was before the war on outside sources for her food supply, and how, with the submarine menace, such dependence nearly brought disaster. A large committee, set up by Mr. Lloyd George, stated, after careful investigation, that there is no reason why Britain cannot become largely self-supporting in the matter of food supplies. This may take some time, even if ever accomplished. There is another factor—other countries (South Africa and South America, for example) have, owing to their proximity to the Home market, secured a greater hold than before the war, and they will take some shaking off. It seems very evident, therefore, that we must, while paying all due attention to the producing end, not neglect consuming markets. It would appear that the commercial intelligence division of the State Department of Agriculture, Industries and Commerce in New Zealand, should be stimulated so that every market can be secured and a stream of our goods directed into every available consuming centre. Further, the farming community should have advice as to the most desirable products for such markets. They should know also whether, without neglecting quality, more attention should be paid to quantity in such matters as mutton and wool. Then, in the case of dairy produce, what percentage of energies should be directed into producing butter, cheese, dried milk, etc. The question of outside markets is also a matter of vital concern to some of the minor industries, such as fruit, poultry and bees.

The extent to which the Dominion protective tariff on imports limits the entry of exportable primary products into certain markets should also receive greater attention than is given to it at present. In a measure it seems unreasonable to impose heavy duties on goods from other lands, and then expect such countries to admit our produce on a parity with that from parts which give them preference on imports.

THE NEED FOR PROGRESS IN CANTERBURY.

In view of the matters referred to above it is patent that each province of New Zealand must do its share in the development of its primary industries. Each province to-day is probably at a different stage of development, and the matter of progress will be somewhat different for each.

The Ideal to Aim at In this connection, the ideal to aim at seems to be that each province of the Dominion should develop and extend those departments of the primary industries that suit its particular soil, climatic and economic conditions; and further, that the products from such enterprise are those that will find a profitable and expanding market at home and abroad. Going a step further, it is desirable that each district in each province should also carry on the industries most suited to it.

It must be realised that this ideal will not be attained in one or several years, but the goal should be striven after systematically and persistently. The striving after this ideal must be at least one of the main objects of the Canterbury Progress League and of all its affiliated bodies.

In case there are people inclined to support a policy of let well alone, the following few facts relating to the exports, the land conditions, and the population of this province may assist to lift them out of smug complacency, and show them how the resources of Canterbury are not being developed as they might be.

Exports During the past thirty-five years the exports from New Zealand as a whole have increased at a rate double that of Canterbury. During the last half of that period the rate increased to five-fold, *e.g.*, in seventeen years New Zealand export values increased by 250 per cent.—Canterbury by only 50 per cent. In wool, we exported from Lyttelton, the chief port of the province, more in 1910 than in any year since, with the exception of 1914. More frozen meat was exported in 1901 than in 1913, and much more than in the average of war years—1914-1918. In other staple products our increase has been very slight, while in certain commodities we have gone back considerably. In volume the trade inwards and outwards at Lyttelton for the past thirty-five years shows but a slight increase. It was no greater in 1917 than in 1901, showing that we have practically marked time for at least sixteen years.

Holdings While not the largest in total area, Canterbury Province has the greatest area of land in New Zealand under occupation, viz., 8,300,000 acres. As to *land holdings*, the average sizes of holdings in three of the provinces in New Zealand are :—

Canterbury	..	647 acres
Wellington	..	439 ,,
Auckland	..	305 ,,

Although already more than twice as large as Auckland, the average holding in Canterbury in the last ten years has further increased by 86 acres, while in Auckland it has decreased, despite the fact that in this period twice as much land was brought under occupation in Canterbury as was the case in Auckland. During this period also individual holdings increased 20 per cent. in Auckland, and by only 8 per cent. in Canterbury. Speaking generally, the trend of land settlement has been towards smaller holdings in the North, but the reverse in the South Island. Taking the largest holdings in Canterbury, those over 10,000 acres, the holdings for the last ten years have increased from 151 to 206.

The relation of these figures to land aggregation on the one hand, and closer settlement on the other, is a matter that should receive consideration, allowance being made for the fact that much South Island land cannot be profitably occupied in small areas.

Population In the last seventeen years the population of Canterbury has increased by 27 per cent. In the same time that of New Zealand increased by 42 per cent. The number of people per unit area doubled in that time in Auckland and Wellington, and this fact only aggravates the position revealed by a study of the export figures, as the Northern provinces trebled the volume of their exports while doubling their consuming population.

Canterbury Farming Efficiency On all sides one hears discussion as to the backwardness of Canterbury, and of the South Island as a whole, when compared with the North. Facts only confirm the general opinion, and a full appreciation of this must stimulate every member of the League to put his best foot forward to make up lost ground. Some people, however, are apt to draw erroneous conclusions from the relative greater prosperity of the North. Many seem to forget that we were a comparatively closely settled district, and had been turning out much agricultural and pastoral produce while the largest areas of the North were in standing forest. When Northern rural development commenced in earnest the virgin land gave forth an abundant harvest, youth and vigour went from all parts—the grass on the other side of the fence is the greenest always—and the expansion of the dairying industry sent the North, with its more abundant rainfall and warmer climate, ahead at a great rate. We in the South who had gone some miles in the race could not be expected to keep pace with this more youthful aspirant when it first entered the contest with so much in its favour, but the time has arrived when we should have our second wind, and we must try and reduce the gap.

We know that the North has lured away some of our most progressive sons of the soil. The prospect of cheap land capable of so much improvement strongly appealed to many Canterbury men, whose chief capital was their bodily strength. Observations show that many of these men have laid the foundation of the successful farming now carried on in other districts. It is only natural that this should be so. for was not Canterbury the cradle of agriculture in New Zealand? Let it be remembered that it was into Canterbury that many modern improvements in the agricultural world were first introduced, and from here they spread to other parts. The double-furrow plough, reaper and binder, threshing mill, are examples.

Those who left this province carried with them the gospel of the new agriculture. The mistake, however, that many make is in thinking that *all* the good farmers left, and that only the stick-in-the-muds remained. Many ascribe our present backwardness to this cause, but such is not wholly the case. The average farmer in Canterbury can claim to be the equal, if not the superior, of his brother in other parts, and, generally speaking, the average farmer is as well up in his work as the average city dweller is in his calling. Any incompetence of the city dweller can be "camouflaged," but the result of the farmer's work is criticised by all. When floods, storms, and droughts happen along, the stock succumb, and crops fail, too often the farmer comes in for all the blame. Again the city man reads of Denmark or of Belgium lands of intensive culture, and thinks that the conditions there can be reproduced here. We may learn something—perhaps much, from other lands—but the systems carried out in any other country could not be profitably adopted *en bloc* in New Zealand. The natural conservatism of the farmer has, in the past, often saved him in this way from trying to outstrip surrounding economic conditions when, with average prices, and not an over-supply of labour, it was often suggested that he should spend 21/-, to get, perhaps, only 20/- in return. The danger now is that the same trait in his character may prevent him spending 30/- to reap 40/-. It is hoped, however, that the war has widened the outlook of some of the more conservative members of the rural community.

While the Canterbury farmer is at least as good as his neighbour, he is broad-minded enough to admit that there is always room for improvement; if not, we, as a province, are in a bad way. Further, while much can be learned from places outside New Zealand, it is indisputable that the knowledge gained by individual farmers over many years, would, if it were gathered, sorted out and made available to each and all, prove the greatest factor in any forward rural movement, and it is hoped that steps will be taken to organise farmers' bureaux in connection with the League, as explained on page 26.

NEED FOR A STOCK-TAKING.

It is obvious that before setting out any suggestions as to how and by what means the primary industries of Canterbury can be developed, a stock-taking of the industries and the land resources as they exist to-day is most desirable. This, as can be realised, is no small task, and the Council is warned that the following remarks present quite a superficial review of the many industries carried on in Canterbury. An effort has been made to secure the co-operation of men who could speak authoritatively on certain rural affairs, and a good deal of what follows has been supplied by these gentlemen, all of whom, it is hoped, will further assist the work of the League.

LAND CONDITIONS IN CANTERBURY.

A short review of the land conditions in Canterbury will not be out of place, and the subject can be conveniently handled under the following heads:—Pastoral Lands, Agricultural Areas and Waste Lands, so-called.

Pastoral Under this heading the hill and mountainous country only will be considered, and this covers nearly two-thirds of the land under occupation in Canterbury, totalling over 5¼ million acres out of some 8¼ million acres in occupation. Since 87 per cent. of New Zealand's exports are pastoral products the importance of this class of land is obvious. Investigation, however, reveals a somewhat unsatisfactory state of affairs on much of our pastoral country, which is, in the main, in tussock and native grasses. Much of it has been continuously grazed for sixty years. Many areas have been overstocked with sheep, and parts with rabbits also, while indiscriminate burning combined with the foregoing has lowered the carrying capacity considerably. Much of the high pastoral country to-day will not carry one sheep to 5 acres, and, according to one authority, the average rental obtained by the Crown was only 1¾d. per acre—which capitalised at 5 per cent. equals 2/11 per acre. This somewhat unsatisfactory condition of much of the hill country has been ascribed to the comparatively short tenure under which most of the country is held, viz., twenty-one years. Since an outgoing tenant only gets compensation for permanent improvements, and nothing for improvements, such as keeping down rabbits and surface grass seed sowing, there is a tendency to neglect these more important matters, especially towards the termination of the lease. At the present time Dr. Cockayne is carrying out an investigation under the Department of Agriculture with a view of seeing what practical steps can be taken for the improvement of these runs, and this gentleman's observations and recommendations are sure to be most valuable. Men with a lifetime experience of this class of country state that the following are among the most important factors for improvement :—

(*a*) Making land freehold, or at least increasing the length of tenure. (*b*) Further extending the fencing of summer from winter country. (*c*) Utilisation of part of Plains near hills as winter country for certain stations. (*d*) Surface sowing with suitable grasses—cocksfoot up to 2,000 to 2,500 feet, *Danthonia*, blue tussock, etc., at higher altitudes—and at the same time keeping stock off till grasses are established. (*e*) Saving of hay and growing more winter feed where suitable land is available. (*f*) Burning only selected areas, and doing this at the proper season, viz., August-September. (*g*) Conducting a vigorous campaign against rabbits.

The carrying capacity of the back country runs bears a distinct relationship to the Plains, as from the former are derived sheep for many of the small farmers' flocks. It is rather startling to be told by the late Director of the Fields Division that despite the advantages in our soil and climate the land devoted to stock in New Zealand carries on the average only one sheep per acre as against 2¾ sheep on the stock land in England.

Agricultural Area This includes the bulk of the land of the Plains and the downs—some three million acres. The parts not included are river-beds, sand dunes, etc., which are considered in the category of waste lands. This area lends itself to a diversity of farming practice to an extent greater than that of any other land in New Zealand, and on it will be found farmers whose methods and results could hardly be much improved upon when every economic condition is considered. Speaking generally, however, the Plains region can by no means be considered as having reached the limit of its production. The results obtained by some farmers in different districts on the Plains have amply demonstrated that considerable development is possible, and it remains to state a few of the directions in which such improvements lie.

(*a*) Closer Settlement This is certainly desirable in some areas, especially those where the soil is heavy and dairying and intensive culture is possible and profitable, as is also the prevention of the land aggregation that has been in evidence to some extent in past years. Especially undesirable in view of the land hunger, is the system by which farmers have acquired the adjoining farm, closed up the house by working the second farm with their own teams and with only slight additional labour, and been thus enabled to pay a price really above the value of the farm as a separate earning unit. The system of sales by exchange still exists, but it is less prevalent than formerly. Its evil effect lay in fictitious values being placed on properties with oft times disastrous results to an industrious purchaser.

(*b*) More Thorough Cultural Methods On many farms it would undoubtedly pay better to cultivate a smaller area annually, and do it more thoroughly. The deeper cultivation of certain soils to break the pan caused by too often ploughing at the same depth wants more attention, as does the earlier cultivation for spring and summer sown crops, with a view of increasing moisture content in the soil. Generally speaking, the farmers of Canterbury have not sufficiently appreciated the comparative dryness of our climate and have not cultivated their land accordingly. The amount of moisture lost to land left unploughed till late in the spring is much greater than that from soil cultivated in the proper manner, but too few recognise this fact.

(*c*) More Judicious Manuring At one time on many Canterbury soils payable crops were grown year after year without manures. This, combined with the fact that in dry seasons artificial manure is not an unmixed blessing, has obscured its real value to many farmers. Far too little has been done to gain accurate knowledge of the manurial requirements for the soils and crops of Canterbury, but this is not the fault of the farmer altogether, as the State has a duty in this connection. Few matters, however, are of greater rural importance than the systematic manuring of crops and grass land, and the method commonly employed of sowing 1 cwt. of manure per acre without regard to its analysis or to the soil and crop to which it is applied is most uneconomical and unscientific. Figures reveal that the quantity of manure applied to the crops is, generally speaking, inadequate, as while the average sowing per acre for the crops grown in the Dominion is, as shown by Mr. L. J. Wild, Agricultural Chemist at Lincoln College, in his recent book on "Soils and Manures in New Zealand," about 1 cwt., the average in Canterbury is little better than ¼ cwt. Of course some farmers sow 1 cwt. and over with most crops, but others sow the manure only for roots, and some sow little or nothing on their farms. Considering that 1 cwt. per acre is equivalent to 1 teaspoonful per square yard, ¼ teaspoonful cannot go far to make up for the plant food removed from the soil of one square yard.

(*d*) **Increased Humus Content** There is abundant evidence that the growing of green crops, especially leguminous ones, to maintain and restore fertility, and to build up the rapidly decreasing humus content of the soil of this province, is a matter of urgency in certain parts. The humus or decayed vegetable matter in the soil not only increases the amount of plant food therein, but also increases its water-holding capacity, and improves its physical condition, as well as making it a better home for necessary soil bacteria.

(*e*) **Using Best Seed Only** This is an essential factor in production that is only by degrees being appreciated by farmers. Too many sow seed without regard to its breeding or its purity and germinating capacity. Again, the same thing applies here as was mentioned with manures—a set quantity is too often sown per acre without regard to quality of seed, time of sowing, type of soil or class of crop.

Not only should the best seed available be sown, but means should be taken to improve the varieties that have shown themselves to be most suited to the province. A good deal has been done at Lincoln College in the way of improving cereals by selection only, and results over a series of years show that the Hunters strain of wheat from the College has yielded four bushels to the acre better than the ordinary commercial Hunters. This increase over the wheat crop of New Zealand at present prices would run into several hundreds of thousands of pounds. One only wants to read of what is being done in other countries in the way of selecting and breeding farm plants to realise the wonderful possibilities in this direction that lie to our hand.

It might also be mentioned here that it has taken a world war to bring home to us the value of raising as much seed as possible on our own land. Those who handle seeds of all kinds know the superiority, in most cases, of the colonial-grown article over the imported one. An extension of the growing of seeds for farm and garden crops is a matter that could be profitably taken up in Canterbury.

(*f*) **Establishing Better Pastures** The grass lands on the Plains, especially those laid down where rotation crops are grown, are as a rule not satisfactory. A tour through the province will reveal that on many paddocks, even in the second year after laying down, there is as much ground bare as that covered with grass. That this state of affairs is unprofitable has been brought home to farmers in recent years, when, owing to the high prices for sheep and wool, and the scarcity of sufficient labour for extensive cropping, the tendency has been to increase the grass areas on the Plains. The question of these grass lands was ably discussed by Dr. Hilgendorf, of Lincoln College, in two articles contributed to the Canterbury Agricultural and Pastoral Journal in 1916 and 1917, and in a recent book by this author on "Pasture Plants and Pastures of New Zealand." Dr. Hilgendorf pointed out that in a typical Plains grass paddock examined there was in the second year of growth 47 per cent. of bare spaces, and this rose to 57 per cent. in the next year. One of the reasons for this was shown by Dr. Hilgendorf to be due to the farmer endeavouring to secure in the one paddock with one sowing an all-round pasture.

The average mixture on the Plains, he pointed out, is :—

Italian Ryegrass ..	4 lbs.
Perennial Ryegrass ..	14 lbs.
Cocksfoot	3 lbs.
Clovers	3 lbs.

It is very evident that in many parts the attempt at securing a general purpose pasture in this way is not a success, and that it would be far more profitable in many districts to secure an area of annual pasture by sowing Italian alone, a perennial pasture by sowing perennial grasses and clovers, and then, where the land suited, to sow permanent grasses, such as cocksfoot, dogstail, and so on. The result of this would give a mixture of grasses on the farm instead of in one paddock.

(*g*) **AGRICULTURAL MISFITS** As development proceeds in the rural districts the tendency is for every new settler to carry on those farming practices that are in vogue with the established farmers in the neighbourhood. This is undoubtedly a safe and desirable course to pursue up to a certain point, but it does not necessarily follow that the established methods, while successful, are the most profitable for the soil, climatic and economic conditions prevailing. Were each district carrying out the farming practice most suited to it there is no doubt that it would mean an increase of tens of thousands to this province. A method for determining the most suitable industries and farm methods for each district will be dealt with when the proposals for a soil survey and a farm management survey are considered. However, even without this, observations made in the different counties show that some farmers are having an uphill fight against natural conditions. Reference will, in a later paragraph, be made to the classes of sheep kept in some districts, which appear to be not the most profitable when all things are considered. So far as arable farming is concerned one finds that some farmers attempt to grow wheat on land totally unsuited to it, even allowing for the patriotic appeals to grow the staple food of the people. On certain farms there are too many white crops grown and not enough forage crops, which has meant a decline in the fertility of the soil. Then in many instances the variety of a crop most suitable to the farm is not sown. One instance of this that came under observation was where in a windy district a farmer continued to grow Hunters wheat, which he admitted yielded some nine bushels less than Tuscan on his land, and this because the former wheat sometimes brought him twopence a bushel more. Nine bushels of wheat extra at 4/– a bushel is 36/–, and 40 bushels of wheat per acre at twopence is 6/8, yet it took some time to persuade the farmer that he was losing money by his persistency in growing Hunters on his farm. Then in Canterbury, although lucerne can be undoubtedly grown successfully to a much greater extent than is attempted at present, still, results are showing that this plant is not economically profitable on every farm even when the most approved methods of establishing it are carried out. In one district two farmers sowed 100 acres between them, and the lucerne only lasted out the first year. It is certainly most advisable to ascertain the areas suited to lucerne, called the king of all fodder plants, and to get it established on such areas, but it is no less advisable to prevent it from being sown on areas to which it is not in any way suited.

(*h*) IRRIGATION The comparatively low moisture content of the soil is very often the chief limiting factor in production on most of the Canterbury Plains. The desirability of retaining the moisture obtained by precipitation as rain has been advocated in Section (*b*), and it now remains to mention a few points on irrigation matters. In the seventies and eighties this question received much attention in the province, and the system of water-races then commenced has proved an inestimable boon on hundreds of thousands of acres.

The water-race system has, generally speaking, only served for stock-watering purposes, and while spasmodic attempts have been made to irrigate certain areas, extension in this direction is desirable, provided suitable areas and methods are chosen. After some study of the subject it will be found that irrigation is not quite the simple matter that many believe. The fact, however, that comparatively large areas—the writer knows of two in particular, one of 250 acres at Springston, and one of 400 acres at Acton, near Rakaia—were irrigated successfully for several years at a cost of 3s. per acre, and that such areas gave yields more than double those of similar lands unirrigated, indicates that there are considerable possibilities for irrigation on the Plains.

One of the points that may cause some difficulty is that of securing a constant supply from the rivers which so often change their course in their wide river-beds, and which are so subject to

LUCERNE ON OLD RIVER BED. LUCERNE WILL GROW ON THIS CLASS OF LAND IF WATER LEVEL SUITABLE

DEPASTURING SHEEP ON IRRIGATED LUCERNE.

THIS HAS POSSIBILITIES IN CANTERBURY

NOTE THE SUPPLY CHANNEL IN FOREGROUND, AND THE METER WHEELS WHICH MEASURE THE WATER SUPPLY TO THE FARM.

sudden floods. One suggested line of action is to obtain the water from the rivers before they enter the Plains, and while they are confined to a narrow bed, and a scheme to this end has, it is understood, been prepared by a local engineer.

Then there are parts of the Plains which will probably not pay to irrigate, *e.g.*, those parts very shingly, where the water rapidly sinks to inaccessible depths, those where there is a hard pan near the surface, and those that are difficult to drain. Further, it will probably pay, at least for some time to come, to devote more attention to irrigating the better class of soils rather than those poor in plant food; as water alone, without adding plant food, will not make the latter soils produce large crops or carry much stock. What seems feasible is that irrigation can be applied to certain suitable areas selected after a soil survey (explained on page 23) has been made of the Plains, *e.g.*, such lands as can be cheaply supplied with adequate water from an adjacent river. Secondly, that to commence with, the irrigation should be applied largely to special crops, such as lucerne.

Even by an extension of the present water-race system it might be possible to irrigate five to ten acres of lucerne on many farms with great advantage to the owners.

The first step should be that full particulars be gathered of past experience, and of the possibilities of irrigation in Canterbury. The Workers' Educational Association, which has taken this matter up, has arranged for Mr. Furkett, of the Public Works Department, to visit Canterbury at an early date and report on this matter. Mr. Furkett has had considerable experience in the old and new worlds on irrigation problems, and his advice should be valuable.

Then it would appear desirable that small areas should be selected to test out different irrigation methods, suitable crops, etc., before a general irrigation scheme were inaugurated. It requires special training to profitably manage irrigated areas, as has been proved in New South Wales, and this point must not be overlooked.

Despite certain limiting factors it is considered that a great deal of the Plains, which have a natural fall of thirty feet to the mile, could be easily irrigated, provided the engineering difficulties of securing a steady and adequate supply from the rivers can be overcome.

Waste Lands Under this heading comes sand dunes and shingle lands on hill and plain. There are 300,000 acres of sand dunes in New Zealand, and Canterbury has its fair share, *e.g*, there is a considerable acreage between Sumner and the Waimakariri River, some 10,000 to 20,000 acres, that will in time, it is hoped, be utilised for tree growing, which it has been proved to be eminently suited for, *vide* City Council Bottle Lake

VIEW SHOWING HEALTHY GROWTH OF YOUNG PINES ON SAND AT CITY COUNCIL BOTTLE LAKE RESERVE

VIEW SHOWING NATURAL AFFORESTATION BY MEANS OF WIND BORNE SEEDS FROM MOTHER TREES, WHICH ARE SHOWN ON LEFT OF PHOTOGRAPH.
PHOTO TAKEN ON NORTH CANTERBURY SHEEP RUN.

Plantations. In these plantations some 1,250 trees are planted six feet apart—20 per cent. loss is anticipated, leaving 1,000 per acre. The trees grow to 100 feet and over in thirty years, and many will yield on a conservative estimate 500 feet of milling timber, worth at least 12s. 6d. per 100 superficial feet. The present day value of grown trees equals 10s. to £1 per tree, and with 1,000 trees per acre, and allowing only 100 superficial feet per tree, the value of an acre is very large in proportion to the initial cost of some £10 an acre for clearing, planting and for trees, while much of the land utilised to-day is valued at less than £5 per acre.

It is difficult to see how the shingle river-beds can be utilised for agricultural or pastoral purposes, although Dr. Cockayne advises that a native plant (*Verbascum blataria*), which is palatable to sheep, gives evidence of being useful. There is, however, a possibility of planting such trees as pines and poplars in parts of the river-beds, but care would, of course, need to be taken not to interfere with the free flow of the rivers, or else severe floods may ensue.

All things considered, it is inexplicable why afforestation has not been extended in New Zealand generally. France and Germany imported before the war thousands of millions of feet of timber, although over 20 per cent. of their area was under forests. New Zealand has less than 3 per cent. under permanent forest, and yet we have planted an average of only 1,600 acres a year, and have set aside for afforestation purposes less than 60,000 acres.

The matter of afforestation on certain areas not suited to agriculture and pastoral pursuits is one of considerable importance. Plantations are going on in certain parts in Canterbury, *e.g.*, Balmoral and Hanmer, and to a small extent on the sand dunes, but an increase in the rate seems imperative in view of the fact that in twenty to thirty years' time New Zealand's millable timber will be exhausted. During the past twenty years some 480,000 acres have been used up and only 32,000 acres planted—an insignificant amount in view of the fact that the Government Forestry Department estimate that 700,000 acres will be needed in thirty years' time to give the country its annual supply of timber. The matter of *natural* afforestation for poor hill country over 2,500 feet (Canterbury has over half a million acres of it) by means of wind-distributed seed from " mother trees " as expounded by Mr. Morrison, the Government Forester at Hanmer, seems a simple, cheap and effective method of utilizing comparatively bare hill country, provided the same results can be obtained in other parts as are possible near Hanmer. The cost is approximately 1s. 10d. per acre, against £10 where trees are planted on the sand dunes. The preservation of the present bush at headwaters of our rivers to act as a sponge, as it were, must also be looked to if we are to avoid having floods more disastrous than those in the past.

LIVE STOCK.

Brief mention must now be made of specific industries. Firstly, those dealing with live stock.

Sheep Canterbury is eminently suited to sheep-farming, and the frozen mutton and lamb of this province is unsurpassed on the British market. The attention devoted to this branch of rural life since the early days of the province has raised the sheepbreeding industry to a relatively high state of proficiency, but he would be a bold man who would say that the highest pitch has been reached.

Taking New Zealand as a whole during the past thirty years, sheep have increased approximately by ten millions, but less than one million of this increase took place in the South Island. Canterbury has practically no more sheep to-day than she had twenty-eight years ago. With 546 sheep per 1,000 acres this province shows lower figures than Taranaki—a dairying district—and figures less than *half* those of the Wellington and the Hawke's Bay district.

With improvement in the native pastures of the hills and the sown grasses on the Plains, and with more ample provision for sheep feed at the time the pastures need assistance—late summer and winter—by supplementary crops, it will be possible to increase considerably the number of sheep in Canterbury without encroaching on other industries.

Then, although Canterbury has probably a greater diversity of breeds of sheep than any other province, it is not certain that every district has the breed or breeds most suited to it. One often sees light-woolled sheep on land capable of carrying heavy woolled sheep, which must result in an economic loss. There seems to be room for experimentation as to the number of sheep of the different breeds that can be carried per acre on different soil types. While Border Leicester sheep may yield a heavier carcase and wool than Southdowns, still if, as some assert, three of the latter can be carried against two of the former on a similar area, a different complexion is put on the matter.

Some back-country stations introduced down-country crossbred sheep in place of merino crosses, and are finding that this is, in many cases, unprofitable, as the former class of sheep do not travel up to the high country, which, therefore, is not utilised to the full extent possible. Having the best class of stock on the different back-country runs as well as on the Plains is a matter deserving attention if Canterbury is to increase her sheep carrying capacity.

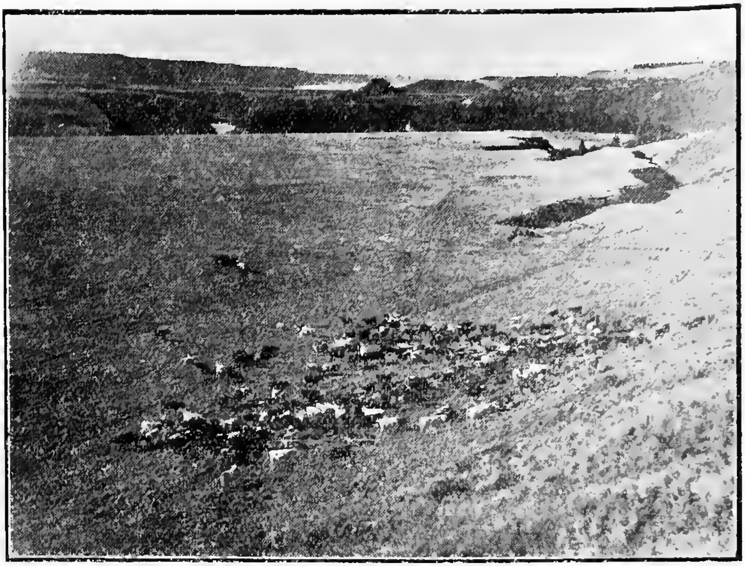
There is also scope for improvement in breeding, especially breeding with a definite object in view. At the present time some authorities assert that, while not neglecting quality altogether, it will pay sheep owners for some years to come to breed more for quantity in both wool and mutton. The neglect of the Down breeds at recent Ram Fairs shows that in a measure farmers are appreciating this point. So far as wool production is concerned, the average weight of a fleece in Canterbury is 7.3lbs. Some state that by proper breeding and selection this could be increased by 1lb. to 2lbs. per fleece, but on small farms where "flying flocks" are the rule not much can be done in this connection. Judging, however, by what has been done with average flocks on average land in different parts, it should be a comparatively easy task to raise the average by ½lb. per head. Taking the number of sheep in Canterbury, the extra ½lb. per fleece would mean another £120,000 on present average prices.

It is gratifying to notice that farmers now have a better appreciation of the value of using first-class rams. At one time any old "scrub ram" was thought to be good enough, and some farmers still think so. If all sheep owners paid strict attention to the selection of rams and ewes, and mated them judiciously, much improvement would still be possible. It has been estimated that for every six acres in the world suited for cattle there is only one acre well suited to sheep. Canterbury has sheep lands unsurpassed anywhere, and it must pay her to see that the sheep industry is fostered and brought up to the highest state of efficiency.

Dairying and Cattle Raising While Canterbury is not, when compared with certain other provinces, altogether suited to these branches of live stock farming, still there are parts, such as Banks Peninsula, the heavy lands on the Coast, and the districts near the foothills of the Alps, where cattle thrive splendidly.

Speaking generally of the class of cattle kept, and of their management, there is considerable room for improvement, and while this branch of farming may not be capable of the same extension as other classes of rural affairs, still there is no reason why, where cattle are kept, a fairly high standard cannot be reached and maintained. On Banks Peninsula, for example, with its 40,000 acres of ploughable land and with much of its remaining 200,000 acres eminently suited to cattle raising, considerable extension is possible. At present there are less than 9,000 dairy cows on the Peninsula, and those who can speak with authority about this area state that this number could be easily doubled.

Statistics reveal that only one bull out of seven used in Canterbury is a purebred. Now, it is wholly desirable that every bull



GOOD NATIVE PASTURE CARRYING GOOD CATTLE
VIEW TAKEN NEAR FOOTHILLS OF THE ALPS.

HARVESTING ON THE FERTILE CANTERBURY PLAINS used should be purebred, and it is practically essential if the industry is to progress, and the state of affairs whereby most of the herds are headed by little better than a "scrub" bull should give much food for thought. Then, only one cow out of every 150 in this province is purebred, and while many grade cows are excellent milkers, still a good sprinkling of purebred cows is desirable, if only to provide sires for the herds. The average for New Zealand of one purebred cow for every 108 kept is much better than the proportion we have in Canterbury.

So far as dairying is concerned the above facts in regard to purebred stock are reflected to some extent in the following data *re* the yields of butter-fat per cow per annum in the different provinces and in New Zealand as a whole.

The Dairy Commissioner for New Zealand has estimated that the average for New Zealand is 160lbs. butter-fat per cow per annum. An estimate from another source gives the figures for several provinces as follows:—

Taranaki	188lbs.
Canterbury	127lbs.
Southland ..	180lbs.

These figures may or may not be quite accurate, but since the same method was employed in estimating each province the figures are comparable.

Canterbury makes a bad showing, especially in comparison with Southland, which has a climate considerably more rigorous. If the average of Canterbury were equal to that of Southland it would, on present prices, mean another quarter million sterling with the number of cows at present in the province.

For some unaccountable reason the question of herd-testing, by means of which it is possible to find the unprofitable cows in the herd, has been practically neglected in Canterbury. In the North Island herd-testing has developed greatly in recent years. In certain districts Herd-Testing Associations have been established, with Government assistance, and these are extending. In one of the chief dairying districts near Christchurch an Association was set up by the Government, but although the work of butter-fat testing was done free by the Government, yet, owing to the little extra work involved in weighing the milk, the Association fell through shortly after its inception. When it is realised that with herd-testing many North Island dairy farmers were able to reduce their herds by one-third and then receive a greater quantity of butter-fat, besides considerably increasing profits by reducing labour and feeding costs, the neglect of this valuable method of dairy improvement in Canterbury is inexplicable. Of 1,060 suppliers to the largest factory in North Canterbury there is not one man herd-testing. This should give much food for thought.

It is satisfactory to note, however, that a few of the more progressive dairy farmers in Canterbury have tested their herds on their own account. One man has supplied figures which are truly astonishing. In 1912 this farmer, who resides on Banks Peninsula, commenced testing his herd of twenty-one cows. The average butter-fat per cow for the first season was 152lbs. During 1913 he bought a yearling Jersey bull, and later on he commenced to breed from this bull, getting eight heifer calves the first year. In 1913 his herd, augmented from outside sources, numbered thirty-two, and it yielded 154.8lbs. per cow. With culling, the average per cow went up to 185.8lbs. the next year. In 1915 the first eight heifers from the Jersey cross came into the herd, and the result was very noticeable at the end of the season, as the average of thirty-five cows was 232.9lbs. Since 1915 the increase has gone on annually until the past season showed a return from thirty-two cows of 300. lbs., and this without counting whole milk fed to calves. which, if included, would, it is estimated, have made the average nearly 314lbs. butter-fat per cow. This man has, within a few years, practically doubled the butter-fat return per cow—the increase of 150lbs., at 1s. 6d. per lb. butter-fat, equalling £11 5s. per cow, which meant a trebling of his profits. Surely such a result should stimulate practically every dairyman to test his cows; the expense is trifling, and it only takes a few minutes night and morning to weigh the milk, and one afternoon a month to test for butter-fat. It may be mentioned that the champion butter-fat cow in New Zealand, a Friesian, gave 939lbs. butter-fat in one year. This cow gave as much butter-fat as seven average Canterbury cows.

It is more than likely that many dairy farmers in Canterbury are to-day milking one in three, some one in every two. cows that are not paying for their keep. There is no reason why the average butter-fat per cow in Canterbury could not be double 127lbs.—the estimate previously mentioned.

The cattle raising industry as distinct from dairying is not what it might be in this province. In the first place, calves are allowed oft times to "scratch along" on whey or skim milk, and the first year of the animal's life, upon which so much depends, is virtually wasted. Then the cattle are, owing to the manner of breeding previously referred to, only mediocre, while the feeding of them is quite casual in many cases. The stock are turned out and left to fossick for themselves, consequently taking four or five years to reach maturity, as the gain in the summer is largely nullified by the scarcity of feed on the farms and runs in the winter. With proper management, especially in the matter of providing winter feed, the time in which the average cattle in Canterbury reach a profitable stage could be materially shortened.

Pig Keeping In a recent number of the Journal of Agriculture the unsatisfactory position in regard to the pig industry was pointed out, and it was mentioned that this was giving the Department some concern. During the past few years the numbers in the Dominion have decreased by over 25 per cent. In two years they have fallen off by 90,000. Although the fact that other industries have paid well, yet when it is considered that pork to-day is 9½d. to 10½d. per lb. to the farmer, while seven years ago it was only 4d., that according to American authorities one acre will return five times as much meat in a pig as in any other animal, and that a good sow will give two litters a year and have on an average six progeny at each litter, there seems to be little reason for neglecting this most important branch of live stock husbandry.

At present, as pointed out by the Agricultural Department, there is a danger of the Dominion not raising sufficient pigs for her own requirements, and this is to be regretted, as pork and bacon are foods that are increasing in popularity rather than otherwise.

At one time pigs were to be found on most farms in Canterbury, but increasing rural prosperity has caused many to dispense with these valuable farm profit makers, and to-day the pigs are raised almost solely in the dairying districts. Many seem to think that pig keeping is only profitable in conjunction with dairying. With the present price of pork this is not so, as some farmers in this country and thousands in America have demonstrated that on good pasture, and by growing forage crops, as rape, clovers, lucerne, barley, peas, and by feeding these off in succession, at the same time giving the pigs access to grain in self feeders set on the grazing plots, pig raising and fattening is a very profitable business without the use of dairy by-products.

An extension of the above practice is recommended in certain localities, and it might be advisable for the State to establish a small farm in Canterbury to test out the best system of raising pigs on forage crops. As one old farmer said: "The pig may not be a good draught animal, but I know of nothing that will more surely pull a farm out from under a mortgage."

FRUIT GROWING.

This has not developed in Canterbury as in many other districts of New Zealand, partly, maybe, because our lands have been in profitable cultivation under other systems of farming. There is abundant evidence, however, that great expansion of commercial fruit growing is possible, and this should be encouraged, as there

PIGS GRAZING ON LUCERNE. AN EXTENSION OF THIS SYSTEM IS RECOMMENDED FOR CANTERBURY

THE INTENSIVE SYSTEM OF REARING POULTRY.

are large tracts of suitable land in this province. It is often thought that only poor land should be devoted to fruit. This is not correct. Fruit growing will usually pay on the best of land. Much capital has gone from Canterbury to other parts of New Zealand, such as Nelson, for orchard development, the advantages Canterbury offered not having been appreciated. Experience has shown that the apples and pears grown on the plains are unsurpassed by any district in New Zealand. The sheltered parts of the Port Hills can grow magnificent stone fruit. In certain parts, such as Akaroa, the fruit often rots on the ground, as there is no proper means of transport to Christchurch. Consequently we bring for our domestic requirements fruit to the extent of some 50,000 cases annually into Canterbury.

The cool storage accommodation for fruit at Christchurch will soon be ample to satisfy the industry for years to come. In the matter of case timber, this province, with its *Pinus* plantations and its proximity to Westland, is more favourably situated than any other province.

Late frosts are sometimes disconcerting in Canterbury, but with an efficient weather bureau and the practice of smudging, which would cost not more than £1 per acre, and mean the saving of fruit worth on an average £75 per acre, the industry need have little to fear in this province. Again, it is suggested that the Lake Coleridge electric power can be used for preventing injury by frosts, and the Public Works Department is experimenting along this line.

It seems, therefore, that in Canterbury the areas devoted to fruit growing, viz., 2,000 acres in commercial orchards, and 1,300 acres in domestic orchards, could be profitably extended.

POULTRY KEEPING.

Canterbury is ideally suited to this industry. This province grows the greatest area of all the provinces of crops such as cereals necessary for successful poultry-keeping. The increased prices of food have handicapped the industry somewhat of late years, but the market outlook is bright, as eggs and poultry are popular staple foods. Except on some dozen estates where poultry is carried on as a business in Canterbury the keeping of poultry is nothing like as profitable as it should be. The housing is ofttimes most defective—on many farms the trees are the roosting haunts, and the demands for bodily maintenance limit egg-production. The gorse fences also are often the nesting places, and many eggs are never gathered. What are gathered are sometimes not fresh, and they are often insecurely packed for market, and hundreds of pounds are lost by damage in transit. All eggs marketed should be graded and marketed along egg-circle lines.

A YOUNG APPLE ORCHARD IN CANTERBURY SHOWING A GOOD CROP OF FIRST-CLASS FRUIT.

VIEW SHOWING BEARING CAPACITY OF PEAR TREES GROWN IN CANTERBURY.

The feeding and general management of poultry is, except in isolated cases, usually haphazard. On general farms, especially, it is not unlikely that half the hens at present kept could be culled out and the farmer get as many eggs as before. The cost of starting in the industry is not great, and it is one that has attractions for the returned soldiers, as well as for the farmer's wife.

BEE KEEPING.

Speaking generally, the bee keeping industry is one that is not sufficiently developed in Canterbury. This province is eminently suited for honey production, and the quality produced is the best in New Zealand. The industry could expand tenfold, as we have the nectar-secreting plants, such as clover, in considerable areas. At present the province produces 200 tons of honey annually, and shareholders in the N.Z. Co-op. Honey Producers' Association have a guarantee from a Home buyer of not less than £60 per ton for three years after the war. Further, the local market is capable of extensive development. In many parts of New Zealand honey is often unprocurable. Bee-keeping is a valuable adjunct to clover-seed growing and fruit growing, and in America orchardists pay bee-keepers to place hives in their orchards at certain seasons of the year.

Bee-keeping is suitable for returned soldiers provided they are afforded facilities for obtaining practical training. The apiary can be commenced on a small scale and increased as the owner gains capital and experience. In Canterbury training facilities are scarce as there is no State Apiary in the South Island. There is only one in New Zealand, and this is at Ruakura, in the Waikato, but apiary management in the south differs from that in the north.

COUNTRY LIFE, FARM LABOUR, RURAL EDUCATION

The above three matters concerning human factors in rural industries are amongst the most vital, and while only brief mention of each can be made here, still, no survey of the primary industries, however brief, would be complete without reference to them. Despite the many advantages accruing from country life—health, independence, and so on—and considering the many conveniences enjoyed by the present-day farmer, such as motor cars, telephones, good roads, railways, etc., still country life does not seem to be always sufficiently attractive even to those brought up in a rural environment. These remarks apply alike to the farmer, the farm labourer, and the youth of the country.

That there has been a comparative rural exodus can be shown by statistics. In 1881 59 per cent. of our population were living in the counties, while to-day there is only 49 per cent. there. If we wished to revert to the ratio of town and country dwellers of 1881 we should to-day have to shift 88,000 people back to the land. Of late years for every 100 people added to the towns there have been only 62 added to the country population.

Of course, the expansion of industries other than rural must needs alter the percentages, but nevertheless many consider that the towns are becoming over-balanced with population in comparison with the country.

The Farmer With regard to the exodus of the farmer himself, the writer knows of three men who owned adjoining farms who have recently sold out and retired to the city. The extension of hydro-electricity in country districts, and the consolidation and improvement of country schools, may act in a measure as holding factors, but still at the root of it all there seem to be far too few farmers who make permanent homes on their farms. The rising land values, and the possibilities of making considerable wealth by selling out, have been much too tempting for many to resist.

The Farmer's Son So far as the farmer's son is concerned, it cannot be wondered at that if his parents are unsettled, so is he, more especially when, as is often the case, he comes to the city for his secondary education. This imbues him to some extent with the glamour of town life, and an office with hours from 9 to 5 seems more inviting than work in all weathers out of doors from "early morn to dewy eve."

There can be little doubt that the country boy is the one who will usually make the most successful farmer, and any means by which he can be retained in rural pursuits must be adopted in the interests of the country generally. Among the means to this end it is suggested that the average farmer should give his boy a more direct interest in the farm, and as he grows older, if possible give him charge of certain departments—preferably in connection with live stock. Too often the boy is put to work of the menial order only, oftentimes without an adequate monetary reward, and his interest in agricultural affairs is therefore killed at an early age.

Then where possible the boy should attend a rural course, preferably at a High School in a country district, so as to give him a more intelligent idea of the fundamental truths underlying farm practices.

The establishment of boys' clubs, such as have proved so successful in America in connection with lucerne growing, calf rearing and pig-raising, is one that is worthy of notice as a means of giving the boy a direct interest in rural affairs at an early age.

The Farm Labourer Finally, in regard to the farm labourer. Here we arrive at the crux of many rural problems, and this question is at present a serious one in New Zealand. During the war the farmer, in order to keep his help, has had to raise wages proportionately to those paid in the city. Sooner or later the price of produce will fall and the farmer will find it difficult to maintain the present high wages, as it seems quite likely that those paid to city workers will remain at a high level for some time to come.

Many proposals have been put forward from time to time on this question, but without materially assisting the agricultural farmer. Among the proposals advanced are the following:—

(*a*) The establishment of industrial works in rural districts so that abundant labour might be available to assist at rush periods, such as harvest time.

(*b*) The erection by the farmers, with Government assistance if necessary, of houses for rural workers, this being especially to encourage married workers on to the land.

This might be an expensive item for many farmers, but those who have made the provision state that it has practically solved the labour question for them.

The matter of housing rural workers received a great deal of attention at the meeting of the Agricultural Council of the Efficiency

Board in Christchurch some sixteen months ago, and it must receive earnest consideration in the future if the farmer is to be sure of obtaining the requisite assistance to carry on his work.

WEATHER BUREAU.

There are several matters that may conveniently be referred to at this stage.

One is the desirability of setting up in Canterbury—preferably in conjunction with the League—a weather bureau for Canterbury. The weather predictions telegraphed from Wellington do not seem to be anything like as accurate, so far as Canterbury is concerned, as those made by a local "weather prophet," and the result is that the Sheep-Owners' Union, the Farmers' Union and the Fruit-Growers' Association have each passed remits recommending the establishment of a separate weather bureau for Canterbury. The value of fairly accurate predictions of snow on high country runs and of frosts in fruit growing districts would mean thousands of pounds saved to sheep-owners and farmers annually; but to secure these results it is necessary that a bureau be established to send advice quickly to different parts, as by the time newspapers reach certain districts it is then too late to take precautions.

SOIL SURVEY.

The object of a soil survey is to ascertain the areas and the different types of soil in Canterbury—in effect a stocktaking of the soils which support the primary industries. The first work would be to conduct a general survey to establish the areas of extensive soil types in the province, such as volcanic soils, silty, swampy, shingly soils, and so on. The next step is one involving much more detailed investigations, and would take some years to complete. It would be to make a detailed county or district survey to determine the soil types upon virtually every farm in the province. This would involve the making of laboratory examination of soils, the ascertaining of the class and depth of subsoil and the height of the water table as well as the class of flora covering the soil surface. Further, the recognised economic adaptation would need to be considered, and this brings the further suggestion of a farm management survey.

Farm Management Survey This really could go hand in hand with the soil survey. Its object is to examine the farming methods in each district, to examine farm accounts—when such are kept—with a view to ascertaining the most ecomonic farming systems at present carried out in each district, and on each soil type.

At present in many districts certain crops are raised and certain class of stock are kept, but whether these are the best for the particular district has never in most cases been ascertained. A farm management survey should give considerable assistance in this connection. In Canada a good deal has been done along these lines. In Ontario a few years ago a Commission surveyed some 885 farms in groups of thirty contiguous holdings, each group being chosen to represent a district of the province. As a result of the survey many striking instances of excellent farming practices were brought to light. Some farms rose above the level of others, not so much because of better soil as because of better planning, better systems, better methods, and above all, better management.

Illustration Farms

In Ontario the farm management survey was carried a step further, as from the best of such farms in each group a selection was made of one to become the illustration farm for the locality. The farmers in each group helped to choose the farm upon which they could have illustrations of further improved methods of farming. The farmer chosen in each case retained his ownership and full control of the farm, carried out the work for three years, and received all returns from the farm.

The demonstration farm was open to inspection for the neighbouring farmers at stated times, and these farmers could thus see what methods were suited to their conditions. Twenty-four illustration farmers sent in reports to the Commission after three years' work. Twenty of these stated that they were now practising a more suitable and systematic rotation than previously, with consequently increased yields. Twelve estimated their increase at 19 per cent.

It must be remembered that these farmers were the best in the district. The percentage of improvement possible on the other farms in each district, then, must have been considerable. Eighteen demonstration farmers stated they were now sowing varieties of grain, etc., more suited to their farms. Every one of the twenty-four was now sowing selected seed, only three were doing so before commencing work with the Commission. Eighteen said they were making more use of labour and time-saving devices than before. Fourteen were using wider implements. Twenty stated that they now planned and adjusted their work to utilise better the help on the farm. Twenty-two of the twenty-four farmers said they were now taking more interest in their farm work generally, and the same men all said that their farm profits generally were greater than before. The demonstration farm system as outlined above is one that should be seriously considered for Canterbury. It possesses certain advantages over State farms, the greatest of these probably being that the neighbouring farmers have more faith in the results, as they know that there has been no lavish expenditure of Government labour and money involved in getting them. Further, the system is cheap and effective. Without a soil survey in Canterbury the establishment of State farms to demonstrate systems of general farming is of little use, as who can say that the results will be applicable to areas within even a short radius of the farm. It might, however, be possible and probably desirable to have small areas managed by the State to demonstrate profitable systems of specific industries such as pig keeping, bee keeping, and such like industries.

The advisability of carrying out soil surveys in different parts of New Zealand has been advocated for some years by Mr. B. C. Aston, the Government Agricultural Chemist, while Mr. Wild, of Lincoln College, has advocated the same for Canterbury for some years, and it is understood that the Government is at present contemplating giving some assistance to Mr. Wild. The Progress League will surely lend its hand, if necessary, in the carrying out of such important works as that of soil and farm management surveys, which would assist this province immeasurably in attaining the ideal expressed previously of each district, developing the particular system of farming most suited to its soil, climatic and economic conditions.

ORGANISATION TO ASSIST PRIMARY INDUSTRIES.

While much can be and will be done by individual effort—in fact, it is the improvement of the individual that is the ultimate object—still, the best means to this end is through organisation.

Board of Agriculture At the head of the organisation of the rural industries in New Zealand is the Board of Agriculture, which was formed primarily to advise the Minister of Agriculture as to the lines along which development should proceed. Many aver that the Board has not achieved the success it was hoped it would, and consider that it might advantageously be reconstituted on a smaller numerical basis, instead of twelve members meeting occasionally it might consist of three who sit permanently, and who, with the Director-General of Agriculture and the Minister of Agriculture, would constitute an executive board, and not purely an advisory one as at present. Further consideration, however, of this aspect of agricultural organisation is beyond the scope of this paper.

Department of Agriculture Then there is the Department of Agriculture, at present undergoing reorganisation, under the recently-appointed Director-General—Dr. Reakes. This Department has been a most powerful factor in the development of agricultural and pastoral interests in New Zealand, and even more is hoped of it when it is reorganised and placed in certain respects on a better footing.

The Director-General of Agriculture has intimated that he and his Department will assist the League in every possible way to further the primary industries of Canterbury. The various rural branches of the League should also be of considerable service to the Department by focussing the problems that want attention in their district. Reference may now be made to what in some respects is the crux of this paper, and that is the establishment, in connection with the Progress League, of farmers' bureaux in the rural districts.

Farmers' Bureaux In a measure it is the improvement of himself that is the chief task the war has imposed upon the farmer. He must realise that he has certain responsibilities in the national interest at the present time, and must regard himself in a measure as a trustee to administer his estate in the most efficient manner possible. It must be admitted that the skill of the individual farmer is much the most important single factor in crop production. The increased production that would be obtained by raising the general level of farming in each district up to something on a par with that of the best farming in each district could not be estimated. In this connection, while not belittling in any degree the value of the Board of Agriculture and the State Department of Agriculture to the primary industries, indications exist indicating that still more can be done by the organisation of the farmers themselves in each rural district on similar lines to the agricultural bureaux as established in some of the Australian States and in America. These bureaux or farmers' clubs are not new to New Zealand, and the work has to some extent been performed by different branches of other farmers' organisations throughout New Zealand, such, for example, as the Farmers' Union. History records that in 1858 a Farmers' Club was started in Christchurch, and that it carried out ploughing matches for several years before becoming defunct.

The chief distinguishing feature of the farmers' bureaux system as established in New South Wales and South Australia, where there are 100 branches in the first-named and 200 branches in the second mentioned State, is that the bureaux are formed in each district solely for *educational* and *social* purposes, political matters being strictly barred. The bureaux in New South Wales are distinct from the Agricultural and Pastoral Associations, which arrange shows, and from the Farmers' and Settlers' Union of New South Wales, which is mainly an organisation set up to attain certain ends by political means.

It might be pointed out that the full particulars of the bureau scheme as it exists in South Australia and New South Wales are in the possession of the League, and could be sent to any district

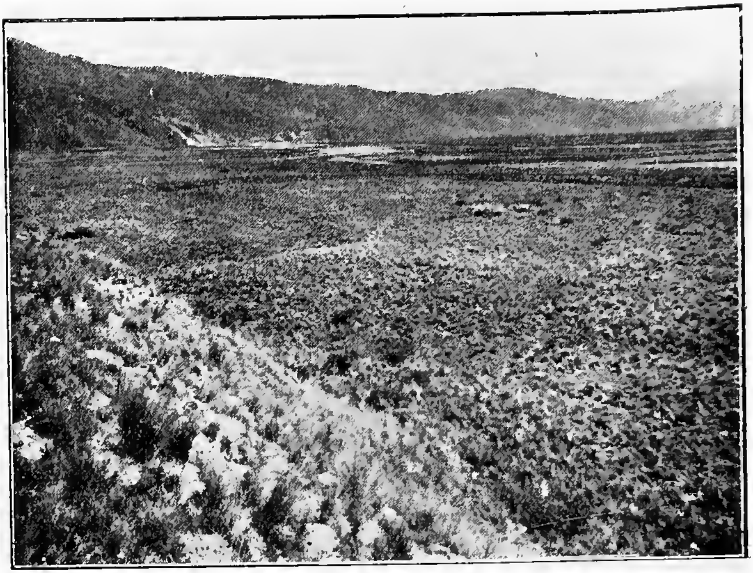


PHOTO OF CANTERBURY HILL COUNTRY SHOWING COMPARATIVE BARENESS OF THE GROUND BETWEEN TUSSOCKS. A CONDITION MOST TIMES DUE TO OVERSTOCKING AND INDISCRIMINATE BURNING.

A MEETING OF AN AMERICAN FARMERS' BUREAU IN THE FIELD. AMERICAN FARMERS KNOW THE VALUE OF GETTING TOGETHER.

desiring to set up a bureau on the lines mentioned. The value of the bureau as a social centre is also one most worthy of consideration.

The organisation of each bureau is simple. It is merely a group of farmers who meet together periodically, usually monthly, to read papers, or to hear them read, and to exchange ideas on the farming problems in their own territories. Lectures are also given from time to time by visiting experts. In Australia brief notes are taken of each meeting, and these are published in the monthly State Journal of Agriculture. By meeting together and exchanging opinions each farmer gets the benefit of every other member's experience. In the United States of America nearly every county of the 3,000 has its own specially trained agent, who organises the bureau and spends his time with the farmers, elucidating problems and giving demonstrations on the farms. In Canada the same system exists. By sorting out the matters of real difficulty in each district and by getting controversial matters tested out by experiments on demonstration farms, as referred to earlier, it would also prevent much of the valueless experimentation that has been carried out for years past all over New Zealand.

The rural branches of the Progress League could form the agricultural bureaux for each district, and there seems no reason why the Department of Agriculture could not co-operate as they do in the Australian States, where the State subsidises the bureaux handsomely and practically runs them.

The different Efficiency Committees set up by the Canterbury Efficiency Commissioner some two years ago might be induced to form a nucleus around which the farmers' bureaux could be established in the counties. The experience they have gained during the past year or two would be invaluable in an organisation such as this, and there can be little doubt that there are to-day as many important matters for the consideration of these committees as there were in war-time.

The establishing of bureaux on lines suggested here is, it is thought, a matter of first importance for any development of the primary industries in this fair province of Canterbury.

CONCLUSIONS.

It may be laid down, then, that production in Canterbury during the last two decades has not expanded to the extent that might reasonably have been expected. Mainly this fact is due to our failure to utilise the stock of knowledge that is already in the country, and to profit by our own experience. In virtually every department our production is capable of great expansion, and in many departments the way is clear. Broadly the aim of any movement for the improvement of production should be not to stimulate a few enterprising farmers or pastoralists to undertake new experiments, but to demonstrate to farmers in general the wisdom and the practicability of the methods by which the most successful men have obtained their results. It is proposed that the Progress League shall use its organisation in two ways: first, to ascertain what the present position of the primary industries is in each district; and second, to provide the machinery by which farmers may assist one another, and may be assisted by State experts to increase the production of their holdings. The scheme that it is intended to adopt has been well tried in other countries, and there is no reason to suppose that it will not prove as valuable here as it has proved elsewhere.

The value of the bureaux to returned soldiers settling on the land would be undoubtedly considerable, and for this reason also their establishment is worthy of consideration.

It is not for one moment thought that it will be possible to at once develop all the industries reviewed above or the lines mentioned, nor to carry out such work as soil and farm management surveys of the whole province, but what seems possible and desirable is that the farmers' bureaux should be established throughout the province, and then each bureau can take up the problems that are considered to be most pressing in its own district. Finally, it is hoped that all those who can will assist by their co-operation and by helpful suggestion the work of the League in the tasks that lie before it, and even if this paper excites some measure of adverse criticism it is felt that it will have achieved something by awakening dormant attention to a subject of such paramount importance to the province.

Canterbury Progress League

HEADQUARTERS :
REDPATH'S BUILDINGS, 183 CASHEL ST., CHRISTCHURCH.

The League is an entirely non-party organisation, formed to promote and assist any movement for the advancement of Canterbury, and by united public action, or by other means, to secure the co-operation of Town and Country to that end.

(*a*) In the matter of railways, roads, and other means of communication.

(*b*) In the development of shipping, commercial, and general business facilities.

(*c*) In the promotion of the industrial, agricultural, and pastoral interests of the Province.

(*d*) In the encouragement of education.

(*e*) In the extension generally—and especially to all country districts—of the hydro-electric scheme.

(*f*) In the improvement and extension of parks and scenic reserves, and in the promotion of town-planning schemes.

(*g*) In the advertisement within New Zealand and abroad of the advantages of Canterbury as a field for business activity, and as a place of residence.

(*h*) In making more widely known the attractions of Canterbury to tourists, anglers and sportsmen generally.

(*i*) In collecting and publishing reliable up-to-date information of the industries, trade, commerce, exports, imports, agriculture, modes of investments, climate, health, cost of living, natural conditions, markets, holiday and pleasure resorts, sport, etc., of the Province; and generally in whatever direction the League may decide to take action for the advancement of Canterbury.

The League needs your active support and your financial assistance, but, above all, it needs and it aims to secure the persistent and enthusiastic co-operation of all the people of the Province.

Christchurch Press Company Limited, Printers